ACID PREPARATION OF VERTEBRATE FOSSILS AT THE BURKE MUSEUM OF NATURAL HISTORY AND CULTURE

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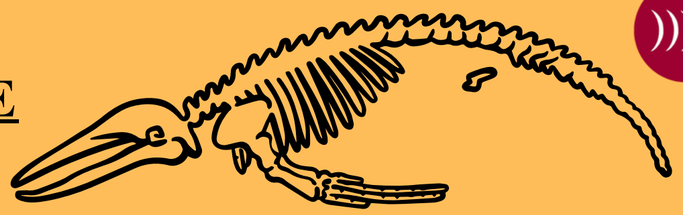

Background

The Burke Museum of Natural History and Culture is the repository for all fossils found on public land in the state of Washington. As a result, the museums collections are filled with the historical flora and fauna of the area. Many of the fossil vertebrates found in WA were marine animals, fossilized in marine sediments. These sediments turned into cemented concretions over the course of millions of years, making them large, heavy and incredibly dense. The fossils inside of these concretions are notoriously difficult to remove. The Burke Museum has specimens in its collection that were collected over 50 years ago, still trapped inside their rocky tombs. This created not only an issue of collections space, but has kept these specimens inaccessible to the public and paleontologists interested in researching and publishing on the incredible diversity of WA fossil life.

Purpose

The purpose of this thesis project is to expedite the process of removing the rock from these fossils through a chemical preparation technique called acid prep. This technique utilizes acetic acid which eats through the rock surrounding the fossils, drastically cutting down on time spent preparing these specimens. Until now, The Burke has lacked an efficient and regulated acid preparation lab. This thesis aims to implement these practices and make these specimens available to researchers, curators, volunteers and the general museum public. The specimens uncovered as a result of this project will greatly add to our understanding of this ancient ecosystem, as well as provide many new incredible specimens for the museum to utilize in their display and collections.

Deliverables

The deliverables for this thesis are a comprehensive Standard Operating Procedure (SOP), meeting the code of the Environmental Health and Safety Department at the University of Washington, as well as a Technical Workflow Document for use by volunteers and preparators utilizing the Acid Prep Lab.

Process

Met with Burke Museum Paleontology Staff and stakeholders to identify the problem and brainstorm solutions that keep best practices at the forefront of the work. Decided to build an Acid Preparation Station inside the Burke Museums Wet Lab.

Started a deep dive of relevant material and publications on acid preparation techniques and methods. Reached out to expert paleontologists on the subject of marine mammal paleontology and preparation. Built a committee to advise on the continuation of the project.

Identified several flagship specimens to serve as the test subjects of the project. Picked specimens from formations across the Pacific Northwest.

Began performing mechanical preparation on several specimens using pneumatic tools.

Wrote an official Standard Operating Procedure (SOP) using the rules and regulations laid out by the University of Washington Health and Safety Department. Made sure to follow all regulations set out by Safety Data Sheets for the various chemicals and tools that are used in the process.

Trained 10+ volunteers on mechanical preparation, added several more flagship specimens.

Utilized acetic acid to remove rock from fossil concretions inside of the Burke Museum. Developed a new methods technique utilizing nesting bins for removing and placing specimens in the acid.

Once best practices had been identified, created a 19 page Technical Workflow Document. This document, designed for volunteers, outlined every step of the Acid Preparation process in a way that is easy to follow and informative. This document ensures that this important work will continue long after this thesis project is complete.

Continued to refine the SOP and Workflow document as trial and error continued. Expanded both exponentially with the influx of new materials purchased with funds secured by the museum as a result of this project.

Finally, held a workshop for volunteers to begin the acid prep process. This workshop went over the technical workflow and gave volunteers all the tools they need to continue this work for years to come, securing acid preparation as a vibrant and permanent piece of the Paleontology lab at the Burke.

Summary

Goals met by this project:

- Developed a nesting bin method for acid prep.
- Prep begun on 14 specimens.
- 9 Volunteers actively working on fossil whales.
- Over 200 hours of prep completed.
- Fossils from 5 different formations in WA.
- Workflow Document Written.
- SOP and Lab Risk Assessments written.
- Lab space built and technical supplies purchased.
- Workshop held to train volunteers on Acid Prep techniques.

Next Steps

There is plenty of work left to do on these concretions, fossil preparation is a long and delicate process. This thesis project laid the groundwork to continue preparing these specimens long into the future. The workflow and SOP will surely be edited over the years as new procedures are utilized and old ones are refined. The best case scenario of this work is that it will continue long after the scope of this project ends and will influence publications, research and exhibitions in the years to come.

References

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